

# General Specifications

GS 05P01C81-01EN

UT55A/MDL, UT52A/MDL  
Controllers  
(Mount on DIN Rail)

UTAdvanced®

Functional  
Enhancement

## Overview

The UT55A/MDL and UT52A/MDL controllers can be mounted in a panel. A ladder sequence function is included as standard. The short depth of the controller helps save instrument panel space. The UT55A/UT52A also support open networks such as Ethernet communication.

## Features

- Simple panel surface  
Mounting the controller in a panel simplifies the panel surface.
- Ladder sequence function is included as standard.  
This function allows for creating a simple sequence control. Dedicated LL50A Parameter Setting Software (sold separately) allows for performing programming using a ladder language.
- Various built-in open network functions such as Ethernet are available.  
Easy connection with various vendors' PLCs is possible. (UT52A support CC-Link and RS485 communication only.)
- Equipped with a multitude of functions  
Universal I/O, eight control modes (cascade control, etc), and retransmission output are included as standard. PID control, heating/cooling control, feed forward control, etc. are available.
- LL50A Parameter Setting Software (sold separately)  
The parameters and ladder programs of UTAdvanced controller can be built from a PC using this software. It makes data management even easier.

## Functional Specifications

### Control Specifications

#### (1) Control Mode

Control functions of the controller can be set as control modes.

Control mode	Function
SGL (1)	Single-loop control
CAS1 (2)	Cascade primary-loop control <sup>(*)1</sup>
CAS2 (3)	Cascade secondary-loop control <sup>(*)1</sup>
CAS (4)	Cascade control <sup>(*)1</sup>
BUM (5)	Loop control for backup <sup>(*)1</sup>
PVSW (6)	Loop control with PV switching <sup>(*)1</sup>
PVSEL (7)	Loop control with PV auto-selector (Max./Min./Ave./Diff.) <sup>(*)1</sup>
PVHD (8)	Control with PV-hold function

\*1: Remote auxiliary analog input is required.

#### 2) Control period

Selectable from 50 ms <sup>(\*)2</sup>, 100 ms, and 200 ms

\*2: Cascade control (Control mode 4) cannot be used.  
"Super" function or "Super 2" function cannot be used.



UT55A/MDL



UT52A/MDL

Table of Number of Inputs and Outputs

Model and suffix code (See the model code)	Number of analog input points	Number of analog output points <sup>(*)3</sup>	Number of contact input points <sup>(*)4</sup>	Number of contact output points <sup>(*)5</sup>
UT55A				
-x0x/MDL	1	1	3	3
-x2x/MDL	2	1	4	3
-x3x/MDL	1	1	8	8
-x4x/MDL	2	1	3	3
-x5x/MDL	2	1	9 (8)	8
-x7x/MDL	4	1	6 (5)	3
UT52A				
-x0x/MDL	1	1	3	3
-x1x/MDL	2	1	4 (3)	3

\*3: Excluding control output

\*4: The numbers in parentheses show the numbers of points in each model with RSP direct input. (/DR option).

\*5: Excluding control output relays

### Control Computation Specifications

#### (1) Combination of types of control and control modes

Types of control	Control mode							
	1	2	3	4	5	6	7	8
PID control	√	√	√	√	√	√	√	√
ON/OFF control	√	N/A	N/A	N/A	N/A	√	√	N/A
Two-position, two-level control <sup>(*)6</sup>	√	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Heating and cooling control <sup>(*)6</sup>	√	N/A	√	√	√	√	√	√
Sample PI control	√	N/A	N/A	N/A	N/A	√	√	√
Batch PID control	√	N/A	N/A	N/A	N/A	√	√	√
Feedforward control	√	N/A	N/A	N/A	N/A	N/A	N/A	√

√: Available N/A: Not Available

\*6: Selectable for heating and cooling control

#### (2) Control Computation Function

(a) Target setting point and the number of PID parameter groups

Respectively, eight sets of target setpoints, alarm setpoints, and PID parameters can be set. For cascade control, respectively, eight sets can be set for main (primary side) and slave (secondary side).

- (b) Selecting the PID parameter group  
The following PID parameter groups can be selected.
- Target setpoint number (SPNO) (The PID number can be set arbitrarily.)
  - Measured input zone PID
  - Target setpoint zone PID
  - Reached target setpoint zone PID
- (c) Auto-tuning
- Tuning results can be selected from two options, Normal or Stable.
  - Tuning output limit can be set. (It cannot be used in heating/cooling control.)
- (d) "Super" function: Overshoot-suppressing function
- (e) "Super 2" function: Hunting-suppressing function
- (f) STOP preset output function
- (g) Input ERROR preset output function
- (h) MANUAL preset output function

### (3) Operation Mode Switching

<b>Operation mode switching</b>	AUTO/MANUAL and RUN/STOP switching CASCADE/AUTO/MANUAL switching REMOTE/LOCAL switching
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### (4) Control Parameter Setting Range

<b>Proportional band</b>	0.1 to 999.9%
<b>Integral time</b>	1 to 6000 sec. or OFF (using manual reset)
<b>Derivative time</b>	1 to 6000 sec. or OFF
<b>ON/OFF control hysteresis (one or two hysteresis points)</b>	0.0 to 100.0% of measured input range width
<b>Preset output value</b>	-5.0 to 105.0% (however, 0 mA or less cannot be output)
<b>High/low output limiter</b>	-5.0 to 105.0% Low limit setpoint < high limit setpoint
<b>Tight shut function</b>	When manual control is carried out with 4 to 20 mA output, control output can be reduced to about 0 mA.
<b>Rate-of-change limiter of output</b>	0.1 to 100.0%/sec., OFF
<b>Output deadband</b>	For heating and cooling control: -100.0 to 50.0%

### (5) Ladder computation period

Ladder computation period is the same as control period.

## Alarm Functions

- Types of Alarm

<b>Measured value alarm</b>	PV (measured value) high/low limit alarm
<b>Deviation alarm</b>	Deviation high/low limit alarm
<b>Rate-of-change alarm</b>	Deviation high and low limits alarm Deviation within high and low limits alarm Analog input PV high/low limit alarm Analog input RSP (ROMOTE) SP high/low limit alarm Auxiliary analog input high/low limit alarm PV rate-of-change alarm
<b>Setpoint alarm</b>	SP (setpoint) high/low limit alarm Target SP high/low limit alarm Target SP deviation high/low limit alarm Target SP deviation high and low limits alarm Target SP deviation within high and low limits alarm
<b>Output alarm</b>	Control output high/low limit alarm Cooling control output high/low limit alarm
<b>Other alarms</b>	Self-diagnosis alarm FAIL

- Alarm Functions

<b>Alarm output action</b>	Alarm stand-by action Alarm latch (forced reset) function Alarm hysteresis Alarm ON/OFF delay timer
<b>Number of alarm settings</b>	8 (per loop)
<b>Number of alarm output points</b>	Up to 8 (differs by model code)

## Contact I/O Function

This function allows for allocating the input error condition, operation condition, alarm condition or other conditions to the contact input and contact output.

<b>Contact input</b>	AUTO/MANUAL switching
	REMOTE/LOCAL switching
	STOP/START switching
	Switching to CASCADE
	Switching to AUTO
	Switching to MANUAL
	Switching to REMOTE
	Switching to LOCAL
	AUTO-TUNING START/STOP switching
	OUTPUT TRACKING switching
	Two-input switching
	PV Hold
	SP number specification
	PID number specification
	Manual preset output number specification
<b>Contact output</b>	Loop 1 alarms 1 through 8
	Loop 2 alarms 1 through 8 (for cascade control)
	Status output

## Ladder Sequence Function

### (1) Number of I/O Points

	UT55A/MDL	UT52A/MDL
<b>Number of digital input points</b>	Up to 9	Up to 4
<b>Number of digital output points</b>	Up to 18	Up to 3

This is limited by the number of contact I/O signal points. (See the model code.)

### (2) Types of Command

	Number of commands	Remark
<b>Number of basic command types</b>	13	Load, AND, OR, Timer, Counter, etc.
<b>Number of application command types</b>	73	Comparison, reverse, addition/subtraction/multiplication/division, logic operation, high/low limiter, etc.

### (3) Sequence Device

	Types of device	Number of points
<b>Digital I/O</b>	Input relay	9 (max)
	Output relay	8 (max)
<b>Internal device</b>	M relay (bit data)	256
	DAT register (data)	28
	P register (parameter)	10
	K register (constant)	30
<b>Special device</b>	Special relay (bit data)	12

\* Process data and process relay can be used besides the above-mentioned.

### (4) Program capacity

Max. Program capacity: 500 steps \*

\*: Available number of steps differs according to the parameters, using command and control period.

### (5) Ladder computation period

Ladder computation period is the same as control period.

## Communication Function

	Function	Method	Interface	Targets	Max connection	Communication Data
Modbus/TCP	A standard industry protocol allowing communications between the controller and devices such as PCs, PLCs, and DCSs.	Server	Ethernet	PLC and others	2 connections	PV, SP, OUT, ALM etc
		Gateway	Ethernet +RS-485	RS-485: UT75A/UT55A/UT52A/UT35A/UT32A/UP55A/UP35A/UM33A <sup>(*)</sup>	31 units	
Modbus (RTU/ASCII)		Slave	RS-485	PLC and others, UT75A/UT55A/UT52A/UT35A/UT32A/UP55A/UP35A/UP32A/UM33A <sup>(*)</sup>	31 units	
PROFIBUS-DP	Used for communication between PLCs and remote I/O, enabling high-speed data transmission.	Slave	RS-485	PLC and others	Number of nodes: 126	
		Modbus master function	RS-485	UT75A/UT55A/UT52A/UT35A/UT32A/UP55A/UP35A	31 Units (Main Controller is included.)	
CC-Link		Slave	RS-485	PLC and others	Number of nodes: 42 (Remote device)	
		Modbus master function	RS-485	UT75A/UT55A/UT52A/UT35A/UT32A/UP55A/UP35A/UP32A/UM33A	31 Units (Main Controller is included.)	
DeviceNet		Slave	RS-485	PLC and others	Number of nodes: 64	
		Modbus master function	RS-485	UT75A/UT55A/UT52A/UT35A/UT32A/UP55A/UP35A	31 Units (Main Controller is included.)	
Peer to peer	A protocol allowing multiple controllers to send and receive data between one another. The Ladder Program is used.	Multi-drop	RS-485 (2 wire only)	UT75A/UT55A/UT52A/UT35A/UT32A/UP55A/UP35A/UP32A	Read/Write: 4 units Read only : 28 units	
Coordinated Communication	A protocol to coordinate the operation of two or more instruments controlling the same process.	Master/Slave	RS-485	UT75A/UT55A/UT52A/UT35A/UT32A/UP55A/UP35A/UP32A <sup>(*)</sup>	Master : 1 unit Slave : 31 units	
PC link	The proprietary Yokogawa protocol allowing communications to PCs, PLCs and touch panels.	Slave	RS-485	PC and others, UT75A/UT55A/UT52A/UT35A/UT32A/UP55A/UP35A/UP32A/UM33A <sup>(*)</sup>	31units	
Ladder	A protocol to communicate to PLCs					

\*1: UT digital indicating controller. Signal conditioner JUXTA. Power monitor POWERCERT can be connected.

\*2: UT digital indication controllers can be connected.

## Physical Interface

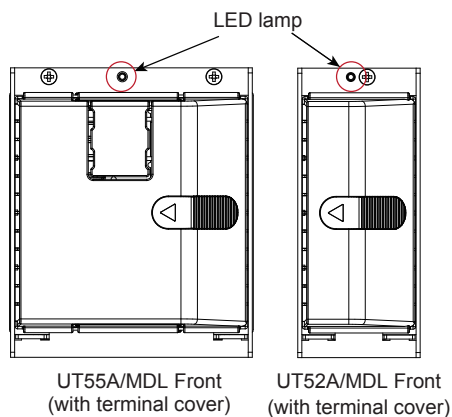
Ethernet	Standard : IEEE802.3 (10BASE-T, 100BASE-TX) Max segment length : 100m Max. Connecting Configuration : Cascade Max. 4 level (10BASE-T), Max. 2 level (100BASE-TX)
RS-485	Standard : EIA RS-485 Communication method : Two-wire half-duplex or four-wire half-duplex, start-stop synchronization and non-procedural Baud rate : 600, 1200, 2400, 4800, 9600, 19200 or 38400bps (*3), Peer to peer communication is fixed at 19200bps Maximum communication distance : 1200m Terminating resistor : 220Ω (External)
*3:	"38400 bps" is available only for UT55A (Type 3 code = 1) and UT52A (Type 2 code = 1)
PROFIBUS-DP	Standard : Field bus (IEC61158) Corresponding version : DP V0 Baud rate : 9.6k, 19.2k, 45.45k, 93.75k, 187.5k, 0.5M, 1.5M, 3M, 6M, 12M, AUTO (*4) Communication distance : <div style="display: flex; justify-content: space-around;"> <span>1200m (9.6k to 93.75k)</span> <span>1000m (187.5k)</span> </div> <div style="display: flex; justify-content: space-around;"> <span>400m (0.5M)</span> <span>200m (1.5M)</span> </div> <div style="display: flex; justify-content: space-around;"> <span>100m (3M to 12M)</span> </div>
*4:	AUTO automatically sets the baud rate to that of the host controller (PROFIBUS-DP master).
CC-Link	Supported version : Remote device (Ver.1.10, Ver.2.00) Baud rate : 156k, 625k, 2.5M, 5M, 10M bps Transmission distance : 1.2km (156k bps), 600m (625k bps), 200m (2.5M bps), 150m (5M bps), 100m (10M bps) When using optical repeater : 7.6 km (156k) to 4.3 km (10M)
DeviceNet	Field bus (IEC61158) Baud rate: 125k, 250k, 500k bps Transmission distance: 500m (125k bps), 250m (250k bps), 100m (500k bps)

## ■ Hardware Specifications

### Display Specifications

The controller status can be verified with the LED.

Status	LED	Lit/Blinks	Description
Normal	Green	Lit	
Communication error	Green	Blinks	
Instrument failure	Red	Lit	Parameter error/ Hardware failure/Ladder program corruption.
Input error	Red	Blinks	sensor burnout, input over



### Universal Input Specifications

- Number of input points: 1
- Types of input, instrument range, and measurement accuracy (see the table below)

Types of input		Instrument range		Accuracy
		°C	°F	
Thermocouple	K	-270.0 to 1370.0°C	-450.0 to 2500.0°F	±0.1% of instrument range ±1 digit for 0°C or more
		-270.0 to 1000.0°C	-450.0 to 2300.0°F	
	J	-200.0 to 500.0°C	-200.0 to 1000.0°F	±0.2% of instrument range ±1 digit for less than 0°C However, ±2% of instrument range ±1 digit for less than -200°C of thermocouple K ±1% of instrument range ±1 digit for less than -200°C of thermocouple T
		-200.0 to 1200.0°C	-300.0 to 2300.0°F	
	T	-270.0 to 400.0°C	-450.0 to 750.0°F	±0.15% of instrument range ±1 digit for 400°C or more ±5% of instrument range ±1 digit for less than 400°C
		0.0 to 400.0°C	-200.0 to 750.0°F	
	B	0.0 to 1800.0°C	32 to 3300°F	±0.15% of instrument range ±1 digit ±5% of instrument range ±1 digit for less than 400°C
	S	0.0 to 1700.0°C	32 to 3100°F	
	R	0.0 to 1700.0°C	32 to 3100°F	±0.1% of instrument range ±1 digit ±0.25% of instrument range ±1 digit for less than 0°C
	N	-200.0 to 1300.0°C	-300.0 to 2400.0°F	
	E	-270.0 to 1000.0°C	-450.0 to 1800.0°F	±0.1% of instrument range ±1 digit for 0°C or more ±0.2% of instrument range ±1 digit for less than 0°C
	L	-200.0 to 900.0°C	-300.0 to 1600.0°F	
	U	-200.0 to 400.0°C	-300.0 to 750.0°F	±0.2% of instrument range ±1 digit for less than 0°C However, ±1.5% of instrument range ±1 digit for less than -200.0°C of thermocouple E
		0.0 to 400.0°C	-200.0 to 1000.0°F	
	W <sup>(2)</sup>	0.0 to 2300.0°C	32 to 4200°F	±0.2% of instrument range ±1 digit
	Platinel 2	0.0 to 1390.0°C	32.0 to 2500.0°F	
PR20-40	0.0 to 1900.0°C	32 to 3400°F	±0.5% of instrument range ±1 digit for 800°C or more Accuracy not guaranteed for less than 800°C	
W97 Re3-W75 Re25	0.0 to 2000.0°C	32 to 3600°F		
Resistance-temperature detector (RTD) 3-wire	JpT100	-200.0 to 500.0°C	-300.0 to 1000.0°F	±0.1% of instrument range ±1 digit <sup>(1)</sup> ±0.1% of instrument range ±1 digit
		-150.00 to 150.00°C	-200.0 to 300.0°F	
	Pt100	-200.0 to 850.0°C	-300.0 to 1560.0°F	±0.1% of instrument range ±1 digit <sup>(1)</sup>
		-200.0 to 500.0°C	-300.0 to 1000.0°F	
		-150.00 to 150.00°C	-200.0 to 300.0°F	±0.1% of instrument range ±1 digit
Standard signal	0.400 to 2.0000 V	-	±0.1% of instrument range ±1 digit	
	1.000 to 5.000 V	-		
	4.00 to 20.00 mA	-		
DC voltage	0.000 to 2.000 V	-		
	0.00 to 10.00 V	-		
	-10.00 to 20.00 mV	-		
DC current	0.00 to 20.00 mA	-		

The accuracy is that in the standard operating conditions: 23 ±2°C, 55 ±10%RH, and power frequency at 50/60 Hz.

\*1: ±0.3°C and ±1 digit in the range between 0 and 100°C  
±0.5°C ±1 digit in the range between -100 and 200°C

\*2: W-5% Re/W-26% Re (Hoskins Mfg.Co.), ASTM E988

- Applicable standards: JIS, IEC and DIN (ITS-90) for thermocouples and resistance-temperature detectors (RTD)
- Input sampling period: Synchronized to control period



- Burnout detection  
Upscale and downscale of function, and OFF can be specified for the standard signal of thermocouple and resistance-temperature detector (RTD).  
For integrated signal input, 0.1 V or 0.4 mA or less is judged as a burnout.
- Input bias current: 0.05  $\mu$ A (for thermocouple and resistance-temperature detector (RTD))
- Resistance-temperature detector (RTD) measured current: About 0.16 mA
- Input resistance  
1 M $\Omega$  or more for thermocouple/mV input  
About 1 M $\Omega$  for voltage input  
About 250  $\Omega$  for current input (with built-in shunt resistance)
- Allowable signal source resistance  
250  $\Omega$  or less for thermocouple/mV input  
Effect of signal source resistance: 0.1  $\mu$ V/ $\Omega$  or less  
2 k $\Omega$  or less for DC voltage input  
Effect of signal source resistance: about 0.01%/100  $\Omega$
- Allowable wiring resistance  
Up to 150  $\Omega$  per line for resistance-temperature detector (RTD) input (conductor resistance between the three lines shall be equal)  
Effect of wiring resistance:  $\pm 0.1^{\circ}\text{C}/10^{\circ}\text{C}$
- Allowable input voltage/current  
 $\pm 10$  V DC for thermocouple/mV/mA or resistance-temperature detector (RTD) input  
 $\pm 20$  V DC for V input  
 $\pm 40$  mA DC for mA input
- Noise reduction ratio  
40 dB or more (at 50/60 Hz) in normal mode  
120 dB or more (at 50/60 Hz) in common mode
- Reference junction compensation error  
 $\pm 1.0^{\circ}\text{C}$  (15 to  $35^{\circ}\text{C}$ )  
 $\pm 1.5^{\circ}\text{C}$  (-10 to  $5^{\circ}\text{C}$  and 35 to  $50^{\circ}\text{C}$ )

### Auxiliary Analog Input Specifications

- This function can be used for remote setpoint setting, external compensating input, auxiliary input for computation, etc.
- Number of input points: see the model code table.
- For types of input, instrument range, and measurement accuracy, see the table below.

Types of input	Instrument range	Accuracy
Integrated signal	0.400 to 2.000 V	$\pm 0.2\%$ of instrument range $\pm 1$ digit
	1.000 to 5.000 V	$\pm 0.1\%$ of instrument range $\pm 1$ digit
DC voltage	0.000 to 2.000 V	$\pm 0.2\%$ of instrument range $\pm 1$ digit
	0.00 to 10.00 V	$\pm 0.1\%$ of instrument range $\pm 1$ digit
DC voltage with High input impedance	0.000 to 1.250 V	$\pm 0.1\%$ of instrument range $\pm 1$ digit

- Input sampling period: Synchronized to control period
- Input resistance: about 1 M $\Omega$   
However, 10 M $\Omega$  or more for high input impedance
- Burnout detection: Functions at standard signal  
Burnout is determined to have occurred if it is 0.1 V or less.

### Contact Input Specifications

- Number of points: 3 points (standard)  
For the maximum number of points, see the model and suffix code table.
- Input type: no-voltage contact input or transistor contact input

- Input contact capacity: 12 V DC, 10 mA or more  
Be sure to use a contact with a minimum ON current of 1 mA or more
- ON/OFF detection  
For no-voltage contact input:  
Contact resistance 1 k $\Omega$  or less in ON state  
Contact resistance 50 k $\Omega$  or more in OFF state  
Transistor contact input:  
2 V or less in ON state  
Leak current 100  $\mu$ A or less in OFF state
- Status detection minimum hold time: control period + 50 ms
- Application: SP switching, operation mode switching, event input

### Analog Output Specifications

- Number of points  
Control output (heating-side output): 1 point (standard), which is shared with transmission output  
Cooling-side output: 1 point, which is shared with transmission output
- Output functions  
Current output or voltage pulse output
- Current output  
4 to 20 mA DC or 0 to 20 mA DC/load resistance 600  $\Omega$  or less
- Current output accuracy  
 $\pm 0.1\%$  of span (however,  $\pm 5\%$  of span for 1 mA or less)  
The accuracy is that in the standard operating conditions:  $23 \pm 2^{\circ}\text{C}$ ,  $55 \pm 10\%$  RH, and power frequency at 50/60 Hz
- Voltage pulse output  
Application: time proportional output  
ON voltage: 12 V or more/load resistance of 600  $\Omega$  or more  
OFF voltage: 0.1 V DC or less  
Time resolution: 10 ms or 0.1% of output value, whichever is larger

### Retransmission Output Specifications

- Number of points: 1 point (standard), which is shared with 15 V DC loop power supply  
Additional 2 points when analog control output and cooling-side analog control output are not used
- Output function: current output  
4 to 20 mA DC or 0 to 20 mA DC/load resistance 600  $\Omega$  or less
- Current output accuracy (conversion accuracy from PV value on the set scale):  $\pm 0.1\%$  of span (however,  $\pm 5\%$  of span for 1 mA or less)  
The accuracy is that in the basic operating conditions:  $23 \pm 2^{\circ}\text{C}$ ,  $55 \pm 10\%$  RH, and power frequency at 50/60 Hz  
This is not conversion accuracy through input and output but the performance of transmission output itself.

### 15V DC Loop Power Supply Specifications

- Number of points: 1 point (standard), which is shared with retransmission output  
Control output (1 point) can also be used.
- Supply voltage: 14.5 to 18.0 V DC
- Maximum supply current: about 21 mA (with short-circuit current limiting circuit)

### Step Response Time Specifications

Within 500 ms (for a control period of 50 ms or 100 ms)

Within 1 s (for a control period of 200 ms)

(Response time at 63% of transmission output when a change is made stepwise in the range between 10 and 90% of input span)

### Relay Contact Output Specifications

- Types of contact and number of points
  - Control relay output: one 1c-contact point
  - Cooling output of heating and cooling control: one 1c-contact point (For UT55A/MDL only)
  - For UT52A/MDL heating/cooling output: 2, 1a-contact points
  - Alarm output: 3 1a-contact points (Common is separated)
- Contact rating
  - 1c-contact: 3 A at 250 V AC or 3 A at 30 V DC (resistance load)
  - 1a-contact:
    - For alarm output: 1 A at 240 V AC or 1 A at 30 V DC (resistance load)
    - For UT52A/MDL control relay output: 3 A at 240 V AC or 3 A at 30 V DC (resistance load)
- \*: The control output should always be used with a load of 10 mA or more.  
The alarm output should always be used with a load of 1 mA or more.
- Application: time proportional output, alarm output, FAIL output, etc.
- Time resolution for control output: 10 ms or 0.1% of output value, whichever is larger

### Transistor Contact Output Specifications

- Number of points: see the model and suffix code table
- Output form: open collector (sink current)
- Output contact capacity: Up to 24 V DC, 50 mA
- Output time resolution: min 50 ms
- Application: alarm output, FAIL output, etc.

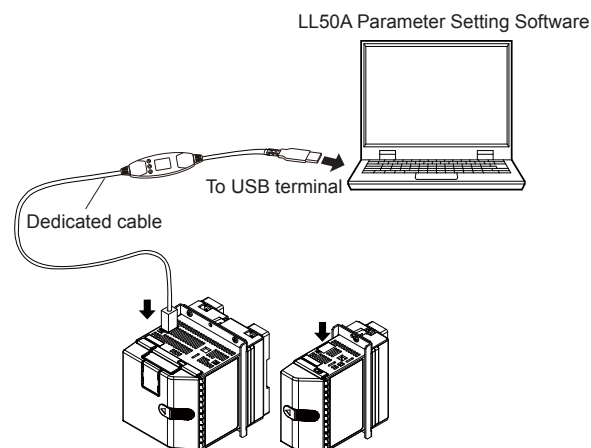
### 24 V DC Loop Power Supply Specifications (for /LP Option)

- Application: Power is supplied to the 2-wire transmitter.
- Supply voltage: 21.6 to 28.0 V DC
- Rated current: 4 to 20 mA DC
- Maximum supply current: About 30 mA (with short-circuit current limiting circuit)

### Maintenance Port Specifications

The maintenance port is used to connect a dedicated cable when using the LL50A Parameter Setting Software (sold separately). Through this port, you can set controller parameters, download ladder programs, and so on.

For details, see the LL50A General Specifications (GS05P05A01-01EN).



Use LL50A with the controller turned on. (The dedicated cable must be connected. LL50A Light-loader adapter cannot be used.)

The maintenance port is not isolated from the PV input terminal. Use the port only for maintenance purposes, such as for setting the controller parameters.

### Safety and EMC Standards

- Safety:
  - Compliant with IEC/EN61010-1 (CE), IEC/EN61010-2-030 (CE), approved by CAN/CSA C22.2 No. 61010-1 (CSA), approved by UL61010-1.
  - Controller with DIN rail (option /MDL): CE marking scheduled
  - Installation category: II
  - Pollution degree: 2
  - Measurement category: I (CAT I) (UL, CSA) O (Other) (CE)
  - Rated measurement input voltage: Max. 10 V DC
  - Rated transient overvoltage: 1500 V (\*)
  - \*: This is a reference safety standard value for measurement category I of IEC/EN/CSA/UL61010-1. This value is not necessarily a guarantee of instrument performance.
- EMC standards:
  - Compliant with
  - CE marking
  - EN 61326-1 Class A, Table 2 (For use in industrial locations),
  - EN 61326-2-3
  - \*: The instrument continues to operate at a measurement accuracy of within  $\pm 20\%$  of the range during testing.
  - EN 55011 Class A, Group 1
  - EN 61000-3-2 Class A
  - EN 61000-3-3
  - EMC Regulatory Arrangement in Australia and New Zealand
  - EN 55011 Class A, Group 1
- KC marking: Electromagnetic wave interference prevention standard, electromagnetic wave protection standard compliance

## Power Supply Specifications and Isolation

- Power supply  
Rated voltage: 100 to 240 V AC (+10%/-15%), 50/60 Hz  
24 V AC/DC (+10%/-15%) (When the /DC option is specified)
- Power consumption: UT55A/MDL: 18 VA (For the /DC option. DC: 9 VA, AC: 14 VA)  
UT52A/MDL: 15 VA (For the /DC option. DC: 7 VA, AC: 11 VA)
- Storage: Nonvolatile memory
- Allowable power interruption time: 20 ms (at 100 V AC)
- Withstanding voltage  
2300 V AC for 1 minute between primary and secondary terminals (UL, CSA)  
3000 V AC for 1 minute between primary and secondary terminals (CE)  
1500 V AC for 1 minute between primary terminals  
500 V AC for 1 minute between secondary terminals  
(Primary terminals = Power (\*) and relay output terminals, Secondary terminals = Analog I/O signal terminals, contact input terminals, communication terminals, and functional grounding terminals.)  
\*: Power terminals for 24 V AC/DC models are the secondary terminals.
- Insulation resistance  
Between power supply terminals and a grounding terminal: 20 MΩ or more at 500 V DC
- Isolation specifications

PV (universal) input terminal, Maintenance port	Internal circuits	Power supply
Remote input terminals		
Aux. analog (AIN2) input terminals		
Aux. analog (AIN4) input terminals		
Control and transmission (analog) output terminal (not isolated between the analog output terminals)		
Control relay (c-contact) output terminal		
Alarm-1 relay (a-contact) output terminal		
Alarm-2 relay (a-contact) output terminal		
Alarm-3 relay (a-contact) output terminal		
Contact input terminal (All) RS485 communication terminal		
Contact output (transistor) terminal		
Ethernet/PROFIBUS-DP/CC-Link/DeviceNet communication terminal		

The circuits divided by lines are insulated mutually.

## Environmental Conditions

### Normal operating conditions

- Ambient temperature: -10 to 50°C  
If the CC-Link option is specified, 0 to 50 °C for UT55A/MDL; 0 to 40 °C for UT52A/MDL.  
(side-by-side mounting: 0 to 50 °C for UT55A/MDL; 0 to 40 °C for UT52A/MDL)
- Ambient humidity: 20 to 90% RH (no condensation)
- Magnetic field: 400 A/m or less
- Continuous vibration (at 5 to 9 Hz) Half amplitude of 1.5 mm or less  
(at 9 to 150 Hz) 4.9 m/s<sup>2</sup> or less, 1 oct/min for 90 minutes each in the three axis directions
- Rapid vibration: 14.7 m/s<sup>2</sup>, 15 s or less
- Impact: 98 m/s<sup>2</sup> or less, 11 msec.
- Installation altitude: 2,000 m or less above sea level
- Warm-up time: 30 minutes or more after the power is turned on
- Start-up time within 10 s

## Transportation and Storage Conditions

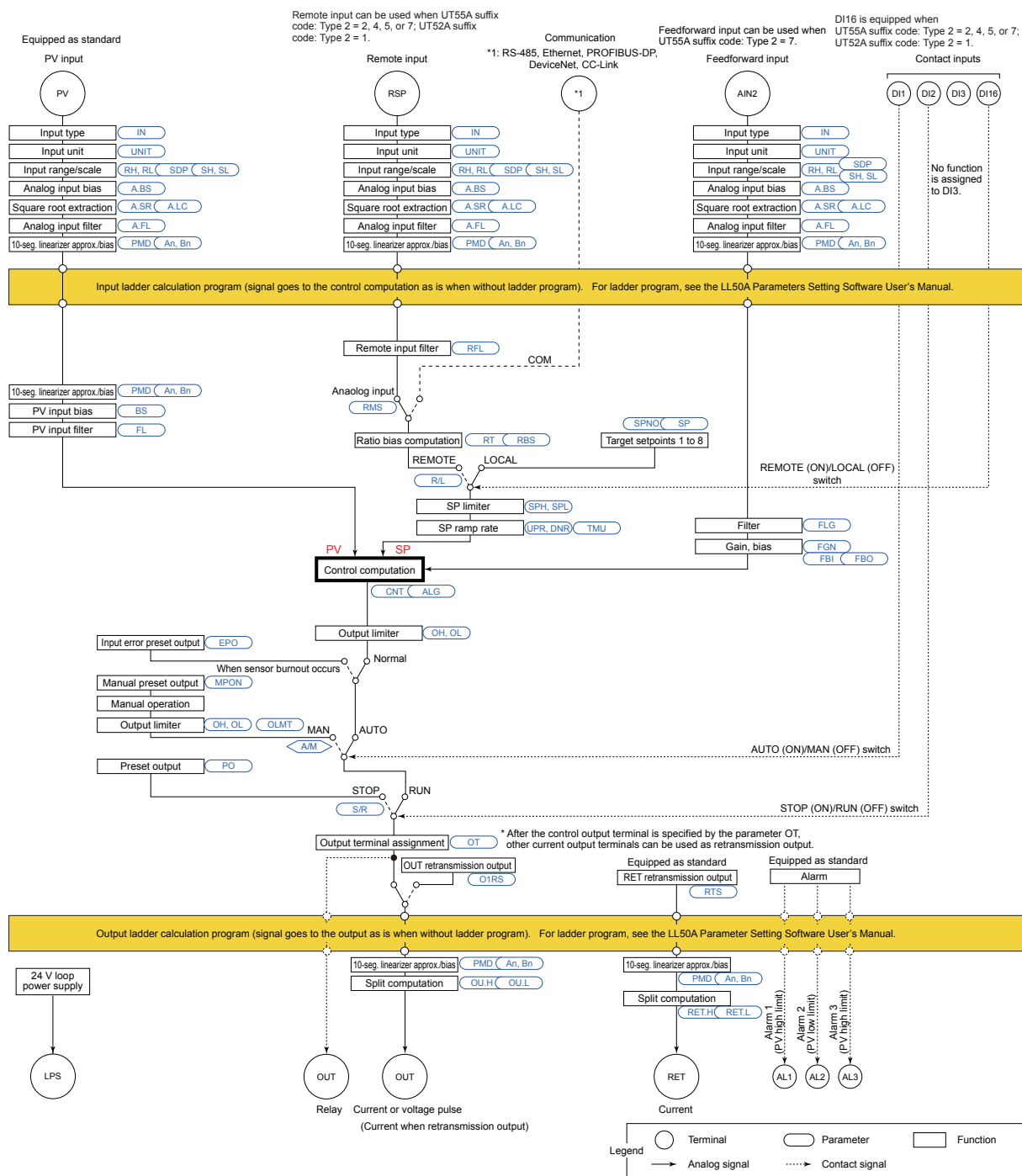
- Temperature: -25 to 70°C
- Temperature change rate: 20°C per hour or less
- Humidity: 5 to 95%RH (no condensation)

## Effects of Operating Conditions

- Effect of ambient temperature  
For voltage or TC input:  
±1 μV/°C or ±0.01% of F.S. (instrument range)/°C, whichever is greater  
For RTD input:  
±0.05°C/°C (ambient temperature) or less  
For current input:  
±0.01% of F.S. (instrument range)/°C  
For analog output:  
±0.02% of F.S./°C or less
- Effect of power supply fluctuation:  
For analog input: ±0.05% of F.S. (instrument range) or less  
For analog output: ±0.05% of F.S. or less  
(Each within rated voltage range)

## ■ Block Diagram

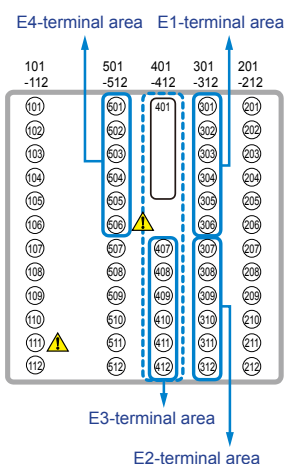
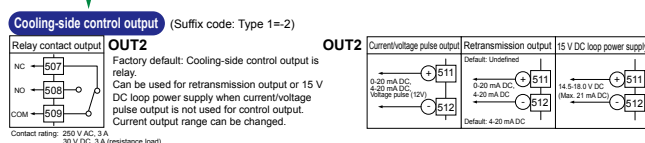
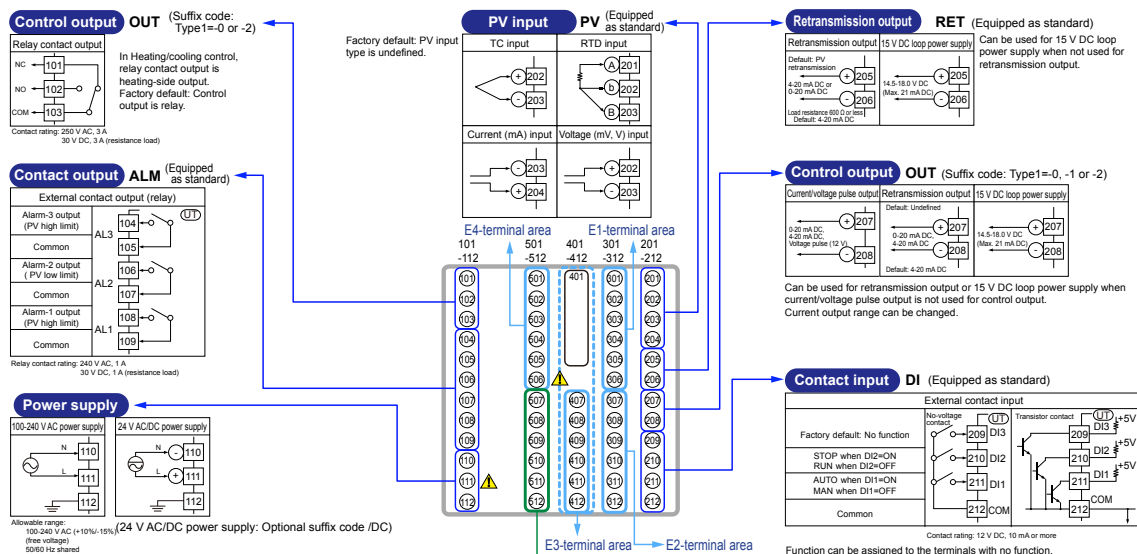
Single Loop Control (For the block diagrams of other control modes, see the user's manual)





## ■ Terminal Arrangement

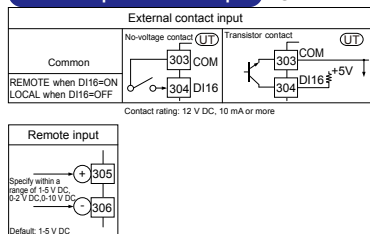
**Terminal Arrangement for UT55A/MDL Single Loop Control (for the terminal arrangements of other control modes, see the user's manual.)**



301-306 E1-Terminal Area

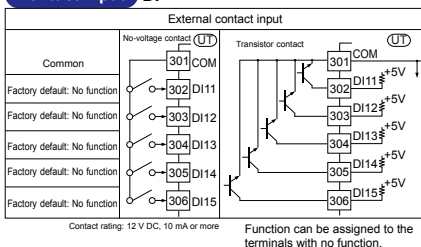
(Suffix code: Type 2=2, 4, 5, or 7)

**Remote input / Contact input**



(Suffix code: Type 2=3)

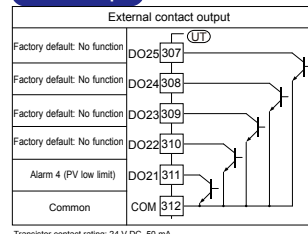
**Contact input**



### 307-312 E2-Terminal Area

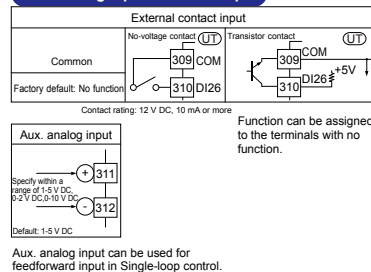
(Suffix code: Type 2=3 or 5)

**Contact output** DO



(Suffix code: Type 2=7)

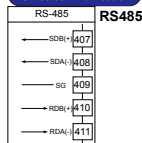
**Aux. analog input / Contact input** AIN2



## 401-412 E3-Terminal Area

(Suffix code: Type 3=1)

## RS-485 communication



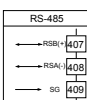
(Suffix code: Type 3=2)

## Ethernet communication (with gateway function)

I/OBASE-T100BASE-TX RJ45 connector

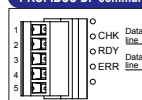
Upper side LED (baud rate)	
Color	Amber
Li	100M bps
Unit	10M bps
Lower side LED (link activity)	
Color	Green
Li	Linked
Blink	Active
Unit	Link failure

## ETHR



(Suffix code: Type 3=4)

## PROFIBUS-DP communication (with Modbus master)



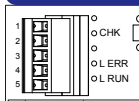
## PROF

Pin	Signal name	Description
1	VP	+5V bus power
2	RxD/TxD-P	Data signal (positive data receive/transmit)
3	RxD/TxD-N	Data signal (negative data receive/transmit)
4	DGND	Signal ground
5	SHIELD	Shield ground



(Suffix code: Type 3=3)

## CC-Link communication (with Modbus master)



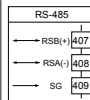
## CC-L

If the UT is located at the end of a segment for the CC-Link communication wiring, terminating resistors are separately needed. These are to be prepared by users. (110 Ω: 1 pc.)

Pin	Signal name	Description
1	FG	Frame ground
2	SLD	Shield
3	DB	RX/TX - signal
4	DB	RX/TX - signal
5	DA	RX/TX + signal

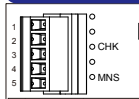
LED	Li	Unit
-----	----	------

CHK (red)	User profile error/ Address error	Normal
L.ERR (red)	Communication failure (CRC error)	Normal
L.RUN (green)	Normal Communicating successfully	No carrier detected/ Connection timeout



(Suffix code: Type 3=5)

## DeviceNet communication (with Modbus master)



## DNET

If the UP is located at the end of a segment for the DeviceNet communication wiring, terminating resistors are separately needed. These are to be prepared by users. (121 Ω: 1 pc.)

Pin	Signal name	Description
1	V+	DeviceNet power supply 24V
2	CAN_H	RX/TX + signal
3	DRAIN	Shield/Drain wire
4	CAN_L	RX/TX - signal
5	V-	DeviceNet power supply common

LED	Li	Unit
-----	----	------

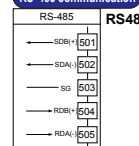
CHK (red)	User profile error	Normal
MNS (green)	Normal Communicating successfully (green, lit)	Not connected (green, flashing)
ERR (red)	Critical link failure (red, lit)	Communication timeout (red, flashing)
	At power-on/Communication failure (green/red, flashing)	No electricity



## 501-506 E4-Terminal Area

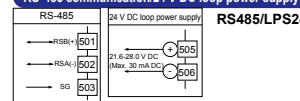
(Suffix code: Type 2=2 and without optional suffix code /LP)

## RS-485 communication



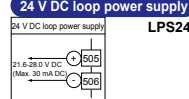
(Suffix code: Type 2=2 and with optional suffix code /LP)

## RS-485 communication/24 V DC loop power supply



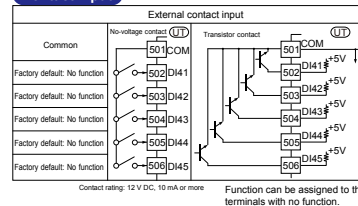
(Suffix code: Type 2=other than 2, 5, or 7 and with optional suffix code /LP)

## 24 V DC loop power supply



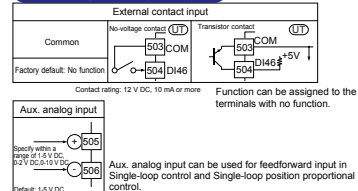
(Suffix code: Type 2=5)

## Contact input DI

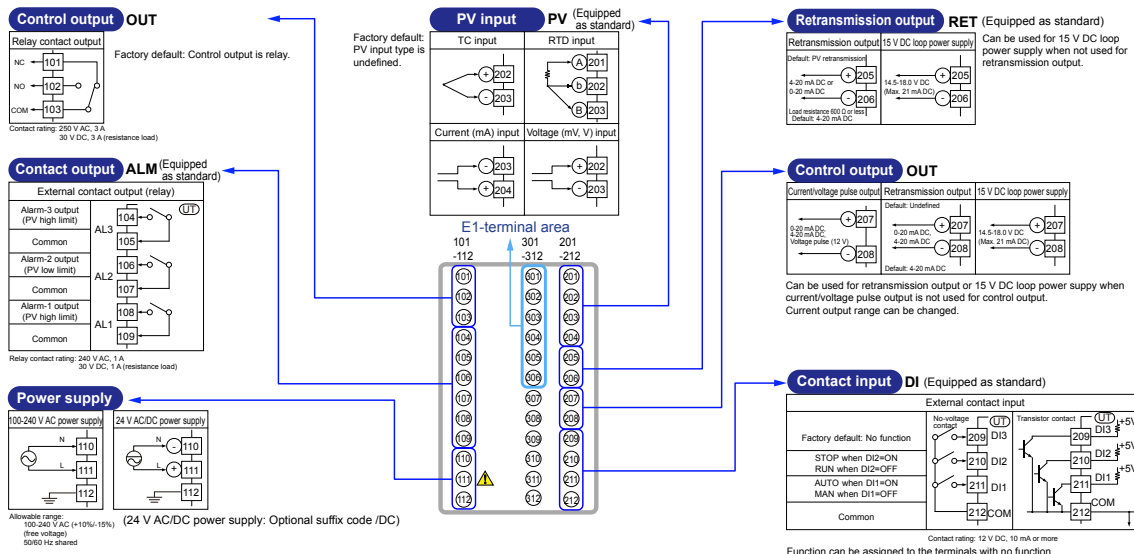


(Suffix code: Type 2=7)

## Aux. analog input/Contact input AIN4

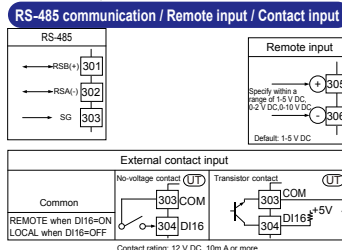


# Terminal Arrangement for UT52A/MDL Single Loop Control (for the terminal arrangements of other control modes, see the user's manual.)

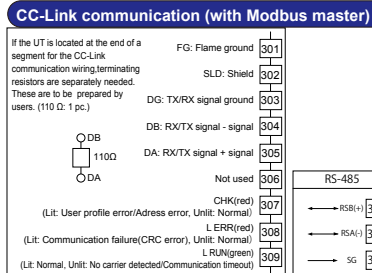


## 301-312 E1-Terminal Area

### (Suffix code: Type 2=1) RSP/RS485

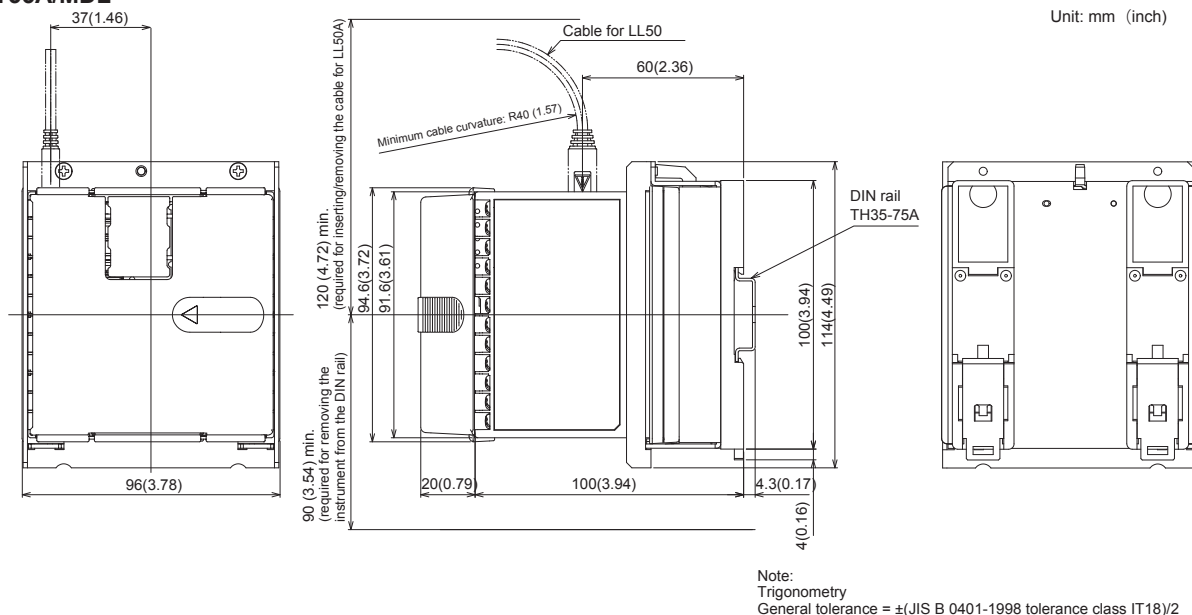


### (Suffix code: Type 3=3) CC-L

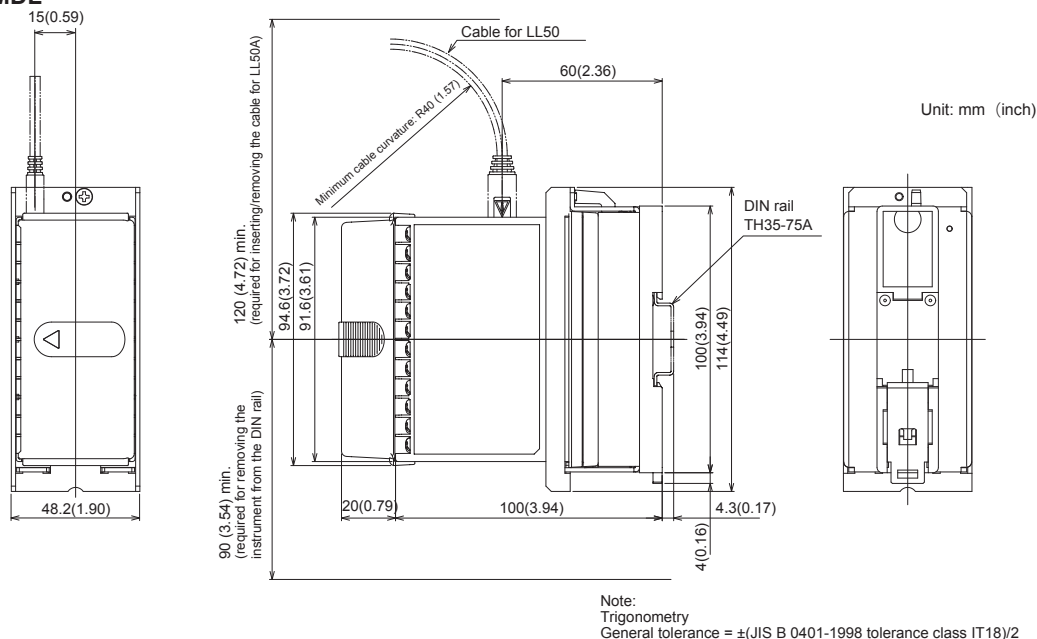


## ■ External Dimensions and Panel Cutout Dimensions

### UT55A/MDL



### UT52A/MDL



## ■ Construction, Mounting, and Wiring

- Construction: Panel mount type
- Material: Polycarbonate resin (Flame retardancy: UL94 V-0)  
DIN rail mounting bracket material: Panel steel sheet
- Case color: Black (Light Charcoal gray)
- Weight: 1 kg or less
- External dimensions (mm):  
UT55A/MDL: 96 (width) x 114 (height) x 100 (depth)  
UT52A/MDL: 48.2 (width) x 114 (height) x 100 (depth)
- Compatible DIN rails: TH35-7.5Fe, TH35-7.5Al, JIS C 2812
- Mounting position: Horizontal.
- Wiring: M3 screw terminal with square washer (signal wiring and power)

## ■ Model and Suffix Code

Model	Suffix code	Optional suffix code	Description
<b>UT55A</b>		<b>/MDL</b> (Required)	Digital Indicating Controller (Power supply 100-240 V AC) (provided with retransmission output or 15 V DC loop power supply , 3 DIs, and 3 DOs) (without the display parts and keys)
Type 1: Basic control	<b>-0</b> <b>-2</b>		Standard type Heating/cooling type
Type 2: Functions	<b>0</b> <b>2</b> <b>3</b> <b>4</b> <b>5</b> <b>7</b>		None Remote (1 additional aux. analog) input, 1 additional DI, and RS-485 communication (Max.19.2 kbps, 2-wire or 2-wire/4-wire) <sup>(*)1</sup> 5 additional DIs and 5 additional DOs Remote (1 additional aux. analog) input and 1 additional DI Remote (1 additional aux. analog) input, 6 additional DIs, and 5 additional DOs 3 additional aux. analog inputs and 3 additional DIs
Type 3: Open networks	<b>1</b> <b>2</b> <b>3</b> <b>4</b> <b>5</b>		RS-485 communication (Max. 38.4 kbps, 2-wire/4-wire) Ethernet communication (with serial gateway function) CC-Link communication (with Modbus master function) PROFIBUS-DP communication (with Modbus master function) DeviceNet communication (with Modbus master function)
Fixed code	<b>-1</b>		Temperature unit: deg C & deg F
Case color	<b>1</b>		Black (Light charcoal gray)
Fixed code	<b>-00</b>		Always "-00"
Optional suffix codes		<b>/MDL</b> (Required)	Mount on DIN rail (without the display parts and keys) <sup>(*)2</sup>
		<b>/LP</b>	24 V DC loop power supply <sup>(*)2</sup>
		<b>/DC</b>	Power supply 24 V AC/DC
		<b>/CT</b>	Coating <sup>(*)3</sup>

\*1: When the /LP option is specified, the RS-485 communication of the Type 2 code "2" is 2-wire system.

\*2: The /MDL option and /LP option can be specified in the combination of Type 2 code (any of "0", "2", "3", or "4") and Type 3 code "1".

\*3: When the /CT option is specified, the UT55A does not conform to the safety standards (UL and CSA) and CE marking (Products with /CT option are not intended for EEA-market).

Model	Suffix code	Optional suffix code	Description
<b>UT52A</b>		<b>/MDL</b> (Required)	Digital Indicating Controller (Power supply 100-240 V AC) (provided with retransmission output or 15 V DC loop power supply , 3 DIs, and 3 DOs) (without the display parts and keys)
Type 1: Basic control	<b>-0</b>		Standard type
Type 2: Functions	<b>0</b> <b>1</b>		None Remote (1 additional aux. analog) input, 1 additional DI, and RS-485 communication (Max. 38.4 kbps, 2-wire )
Type 3: Open networks	<b>0</b> <b>3</b>		None CC-Link communication (with Modbus master function)
Fixed code	<b>-1</b>		Temperature unit: deg C & deg F
Case color	<b>1</b>		Black (Light charcoal gray)
Fixed code	<b>-00</b>		Always "-00"
Optional suffix codes		<b>/MDL</b> (Required)	Mount on DIN rail (without the display parts and keys) <sup>(*)1</sup>
		<b>/DC</b>	Power supply 24 V AC/DC
		<b>/CT</b>	Coating <sup>(*)2</sup>

\*1: When the /MDL option is specified, the model and the suffix codes are as follows:

UT52A-010-11-00/x/MDL

UT52A-003-11-00/x/MDL

\*2: When the /CT option is specified, the UT52A does not conform to the safety standards (UL and CSA) and CE marking (Products with /CT option are not intended for EEA-market).



## ■ Items to be specified when ordering

Model and suffix codes, whether User's Manual and QIC required.

## ■ Standard accessories

Terminal cover and Operation Guide for Single-loop Control.

## ■ Special Order Items

Model code	Suffix code	Description
LL50A	-00	Parameter Setting Software
X010	See the General Specifications (*)	Resistance Module

\*: Necessary to input the current signal to the voltage input terminal.

Name	Model
Terminal cover (for UT55A)	UTAP001
Terminal cover (for UT52A)	UTAP002
User's Manual (CD)	UTAP003

## User's Manual

Product user's manuals can be downloaded or viewed at the following URL. To view the user's manual, you need to use Adobe Reader 7 or later by Adobe Systems.

URL: <http://www.yokogawa.com/ns/ut/im/>